

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Claims 24-27 are requested to be cancelled. Previously withdrawn Claims 1-10, 17-19, and 28-32 are also requested to be cancelled. Claims 11-16 and 20-23 are currently being amended. No claims are being added. After amending the claims as set forth above, claims 11-16 and 20-23 are now pending in this application.

For simplicity and clarity purposes in responding to the Office Action, the Applicant's remarks are primarily focused on the rejections of the independent claims (i.e. 11 and 20) outlined in the Office Action with the understanding that the dependent claims that depend from the independent claims are patentable for at least the same reasons (and other reasons) that the independent claims are patentable. The Applicant expressly reserves the right to argue the patentability of the dependent claims separately in any future proceedings.

I. Claim Rejections - 35 USC §112, ¶2

The Examiner rejected claims 11-16 and 20-23 on the basis that “[t]he claims seem to suggest substituting a random number for missing data that will not produce reproducible results which is required for patentability.”

Claim 11 recites

estimating the probability of the adverse event for a second group of loans using the second mathematical model, wherein at least some loan data for the set of explanatory variables is not available for the second group of loans, and wherein

estimating the probability of the adverse event for the second group of loans includes randomly drawing error values from the set of error values and adjusting the outputs of the second mathematical model for the second group of loans in accordance with the randomly drawn error values, **the randomly drawn error values causing a distribution of the probability values produced by the second mathematical model for the second group of loans to more closely match a distribution of the probability values produced by the first mathematical model for the first group of loans.**

Hence, in claim 11, the reproducible result is not the estimation of the probability of an adverse event for a **single loan** but rather the estimation the probability of the adverse event for a **group of loans**. Hence, even if there is a random selection of an error value in connection with a single loan, the overall result (the estimated probability for the group of loans) is still reproducible. *See e.g.*, [0061] (“For a large group of loans, the random draw from the sets of errors brings the ACI estimates produced by the missing-variable models into overall alignment with the complete-variable model of Eq. (1) by preserving the distribution of the imputed ACI relative to the ACI as calculated with the complete data set, although the ACI estimates will, of course, still experience errors on a loan-by-loan basis.”)

Claim 20 as amended includes similar language to claim 11. Accordingly, withdrawal of the claim rejections under 35 USC §112, ¶2 is respectfully requested.

II. Claim Rejections - 35 USC §101

The Examiner rejected claims 11-16 and 20-23 as being directed to non-statutory subject matter. Claims 11 and 20 have been amended to recite “[m]achine readable media having stored therein a set of instructions that when executed cause a computer to implement a process....” A corresponding amendment has been made to the specification. No new matter has been added. (Applicant respectfully storage in machine-readable media is an inherent aspect of a computer system. See paragraph [0117])

Thus, it is believed that claims 11 and 20 are believed to recite statutory subject matter. Accordingly, withdrawal of the claim rejections under 35 USC §101 is respectfully requested.

III. Claim Rejections - 35 USC §103

The Examiner rejected claims 11-16 and 20-23 as being obvious over Starkman (U.S. Pat. No. 7,188,084) (hereinafter, “Starkman”) in view of Ferguson (U.S. Pub. No. 2003/0149603) (hereinafter, “Ferguson”).

Legal Standard – 35 U.S.C. § 103

On pages 2-4 of the Office Action, Claims 1-39 were rejected under 35 U.S.C. § 103(a). 35 U.S.C. § 103(a) states:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Obviousness under 35 U.S.C. § 103(a) is a legal conclusion involving four factual inquiries:

- (1) the scope and content of the prior art;
- (2) the differences between the claims and the prior art;
- (3) the level of ordinary skill in the pertinent art; and
- (4) secondary considerations, if any, of nonobviousness.

See Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966). See also KSR Int’l Co. v. Teleflex Inc., 127 S.Ct. 1727, 1734, 82 USPQ2d 1385, 1391 (2007) (“While the sequence of these questions might be reordered in any particular case, the [Graham] factors continue to define the inquiry that controls.”).

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of presenting a *prima facie* case of obviousness. See In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955,1956 (Fed. Cir. 1993). A *prima facie* case of obviousness is established by presenting evidence that would have led one of ordinary skill in the art to combine the relevant teachings of the references to arrive at the claimed invention. See In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988) and In re Lintner, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972). Further, the Examiner must provide references that comply with the all claim limitations standard. A broad conclusory statement regarding the obviousness of modifying a reference, standing alone, is not “evidence.” Thus, when an Examiner relies on general knowledge to negate patentability, that knowledge must be articulated and placed on the record. See In re Lee, 277 F.3d 1338, 1342-45, 61 USPQ2d 1430, 1433-35 (Fed. Cir. 2002). See also In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999).

Recently, in KSR Int’l v. Teleflex, the Supreme Court rejected a rigid approach to the question of obviousness. 550 U.S. ___, 127 S.Ct. 1727, 1738 (2007). At the same time, however, the Supreme Court recognized that, “inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.” *Id.* at 1741. Thus, a patent composed of several elements “is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *Id.* Therefore, there must be an articulated reasoning with a rational underpinning to support a legal conclusion of obviousness. *Id.* (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”) (quoting In re Kahn, 441 F.3d 977, 988 (Fed. Cir. 2006)).

Independent Claim 11

As stated in the 35 U.S.C. § 103 legal standard section, the Examiner must comply with the all claim limitations standard to establish a *prima facie* basis to deny patentability to the claimed invention under 35 U.S.C. § 103.

Claim 11 as amended recites:

11. Machine readable media having stored therein a set of instructions that when executed cause a computer to implement a process for determining a probability of an adverse event in connection with a plurality of loans, the plurality of loans having varying amounts of loan data available, the process comprising:

[A] **constructing a first mathematical model for use with loans for which loan data is available for a set of explanatory variables**, the set of explanatory variables including variables that relate to risk characteristics of the loan, risk characteristics of collateral for the loan, and risk characteristics of a borrower associated with the loan;

[B] **constructing a second mathematical model for use with loans for which at least some of the loan data for the set of explanatory variables is not available**, including

[i] estimating the probability of the adverse event for a first group of loans for which the loan data is available for the set of explanatory variables **using the first mathematical model**,

[ii] iteratively estimating the probability of the adverse event for the first group of loans using the second mathematical model,

[iii] selecting an optimal set of weighting coefficients for the second mathematical, the optimal set of coefficients being selected so as to minimize errors in outputs generated by the second mathematical model for the first group of loans **relative to outputs generated by the first mathematical model** for the first group of loans, and

[iv] **storing a set of error values**, the set of error values relating to the errors in the outputs generated by the second mathematical when using the optimal set of coefficients **relative to the outputs generated by the first mathematical model**; and

[C] estimating the probability of the adverse event for a second group of loans using the second mathematical model, wherein at least some loan data for the set of explanatory variables is not available for the second group of loans, and wherein estimating the probability of the adverse event for the second group of loans includes **randomly drawing error values from the set of error values and adjusting the outputs of the second mathematical model for the second group of loans in accordance with the randomly drawn error values, the randomly drawn error values causing a distribution of the probability values produced by the second mathematical model for the second group of loans to more closely match a distribution of the probability values produced by the first mathematical model for the first group of loans.**

(Applicant notes that, for sake of facilitating the present discussion only, each of the steps has been designated [A], [B][i]-[B][iv], and [C], respectively.)

First, Starkman in view of Ferguson does not suggest claim 11 because Starkman in view of Ferguson does not suggest “constructing a first mathematical model...” and “constructing a second mathematical model for use with loans *for which at least some of the loan data for the set of explanatory variables is not available.*” Hence, in arrangement set forth in claim 11, first and second mathematical models are constructed. The second mathematical model is for use with loans for which at least some of the loan data for a set of explanatory variables is not available. As set forth in sub-steps [B][i]-[B][iv], the second mathematical model is constructed using outputs of the first mathematical model.

The Office Action states that “Starkman does not explicitly teach *dealing with missing data* but Ferguson teaches removing and replacing any outlier data.” (Emphasis added). Accordingly, because this limitation refers to “loan data [that] is not available,” the Examiner’s position appears to be that this limitation is disclosed by Ferguson and not Starkman. If this is not the Examiner’s position, then clarification is respectfully requested.¹

Ferguson does not disclose “constructing a second mathematical model for use with loans for which at least some of the loan data for the set of explanatory variables is not available” as recited in claim 11. The Examiner cites the Abstract of Ferguson, which states as follows:

¹ Applicant notes that these features of claim 11 also do not appear to be addressed in the Abstract of Starkman, cited by the Examiner, which states as follows:

The present invention, in one aspect, relates to tools for forecasting cash flow and income from a collateral based loan portfolio that are particularly useful in volatile markets. In one specific embodiment, **consumer payment behavior is modeled**, and account movement is simulated. For each month, actual payment amounts can be compared to delinquency, and frequency of payment can be compared to delinquency. Actual performance is then applied to current contractual payments for forecasting. In addition, the models facilitate determination of where payments are coming from, i.e., who is paying.

(Emphasis added.) Hence, although the Abstract discloses that consumer behavior may be modeled, there does not appear to be disclosure of constructing a second mathematical model using outputs of a first mathematical model in the manner set forth in claim 11.

A system and method for preprocessing input electronic commerce data to **a non-linear model for use in an electronic commerce (e-commerce) system**. The non-linear model includes parameters that define the representation of the e-commerce system, and operates in two modes: run-time and training. A data preprocessor preprocesses received data in accordance with predetermined preprocessing parameters, and outputs preprocessed data. The data preprocessor includes an input buffer for receiving and storing the input data. The input data may include one or more outlier values. **A data filter detects and removes, and may optionally replace, any outlier values in the input data, generating corrected input data**. An output device outputs the corrected data from the data filter as preprocessed data, which may be input to the non-linear model in training mode to train the non-linear model, and/or in run-time mode to generate control parameters and/or predictive output information for the e-commerce system.

(Emphasis added.) Thus, although the Abstract discloses non-linear model includes parameters that define the representation of the e-commerce system, and operates in two modes: run-time and training, there does not appear to be disclosure of constructing a second mathematical model using outputs of the non-linear model in the manner set forth in claim 11.²

Second, Starkman in view of Ferguson does not suggest claim 11 because Starkman in view of Ferguson does not suggest the specific steps for creating the second mathematical model based on the outputs of the first mathematical model as recited in claim 11. Specifically, claim 11 recites “estimating the probability of the adverse event for a first group of loans for which the loan data is available for the set of explanatory variables using the first mathematical model,”

² The Examiner cites the paragraph [0089] of Ferguson, which states as follows:

[0089] As used herein, the term "product" is intended to include various types of goods or services, such as books, music, furniture, on-line auction items, clothing, consumer electronics, software, medical supplies, computer systems etc., or various services such as loans (e.g., auto, mortgage, and home re-financing loans), securities (e.g., CDs, stocks, retirement accounts, cash management accounts, bonds, and mutual funds), ISP service, content subscription services, travel services, or insurance (e.g., life, health, auto, and home owner's insurance), among others.

(Emphasis added.) It appears that the Examiner is citing [0089] for the limited concept that the outlier data that may be replaced in Ferguson may be data related to loans. There does not appear to be disclosure of constructing a second model using outputs of the non-linear model in the manner set forth in claim 11.

“iteratively estimating the probability of the adverse event for the first group of loans using the second mathematical model,” “selecting an optimal set of weighting coefficients for the second mathematical, the optimal set of coefficients being selected so as to minimize errors in outputs generated by the second mathematical model for the first group of loans relative to outputs generated by the first mathematical model for the first group of loans,” and “storing a set of error values, the set of error values relating to the errors in the outputs generated by the second mathematical when using the optimal set of coefficients relative to the outputs generated by the first mathematical model.” **The Office Action does not specifically address these limitations of claim 11. In the event that the rejection is maintained, clarification is respectfully requested.**

Finally, Starkman in view of Ferguson does not suggest claim 11 because Starkman in view of Ferguson does not suggest the use of error values in the manner set forth in claim 11. Specifically, claim 11 recites “storing a set of error values ... relating to the errors in the outputs generated by the second mathematical when using the optimal set of coefficients relative to the outputs generated by the first mathematical model” and “estimating the probability of the adverse event for a second group of loans using the second mathematical model, ... and wherein estimating the probability of the adverse event for the second group of loans includes randomly drawing error values from the set of error values and adjusting the outputs of the second mathematical model for the second group of loans in accordance with the randomly drawn error values, the randomly drawn error values causing a distribution of the probability values produced by the second mathematical model for the second group of loans to more closely match a distribution of the probability values produced by the first mathematical model for the first group of loans.” Hence, in claim 11, the error values are used to cause the distribution of the probability values produced by the second mathematical model for the second group of loans to more closely match a distribution of the probability values produced by the first mathematical model for the first group of loans. **The Office Action does not specifically address these limitations of claim 11. In the event that the rejection is maintained, clarification is respectfully requested.**

Independent Claim 20

Independent claim 20 recites “estimating a second set of weighting coefficients for a second mathematical model by performing a second regression operation, the second model being a function of only a subset of the predetermined loan parameters and the second set of weighting coefficients, the second set of weighting coefficients being associated with respective ones of the subset of the predetermined set of loan parameters, the second regression operation causing the second mathematical model to produce a probability distribution which is in overall alignment with a probability distribution produced by the first mathematical.” Neither Starkman nor Ferguson suggests estimating a second set of weighting coefficients for a second mathematical model by performing a second regression operation which causes the second mathematical model to produce a probability distribution which is in overall alignment with a probability distribution produced by the first mathematical in the manner set forth in claim 20. Likewise, independent claim 20 recites “determining the probability of the adverse event using the second mathematical model in connection with a second plurality of loans, including randomly drawing error values from the set of error values and adjusting the outputs of the second mathematical model for the second plurality of loans in accordance with the randomly drawn error values, the randomly drawn error values causing a distribution of the probability values produced by the second mathematical model for the second plurality of loans to more closely match a distribution of the probability values produced by the first mathematical model for the first group of loans.” Neither Starkman nor Ferguson suggests using error values in the manner set forth in claim 20. **The Office Action does not specifically address these limitations of claim 20. In the event that the rejection is maintained, clarification is respectfully requested.**

Claim 23

With regard to claim 23, Applicant respectfully traverses the Official Notice.³ The Examiner states that it is old and well known to iteratively solve for a value (e.g., a random number between 1 and 100) and, therefore, “it would have been obvious to ... solve for the credit premium using that method.” However, there is no explanation as to why a person of ordinary skill the art would have been motivated to solve for credit premium as opposed, for example, to solving for some random number between 1 and 100.

IV. Conclusion

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Further, the Applicant respectfully puts the Patent Office and all others on notice that all arguments, representations, and/or amendments contained herein are only applicable to the present Application and should not be considered when evaluating any other patent or patent application including any patents or patent applications which claim priority to this patent Application and/or any patents or patent applications to which priority is claimed by this patent Application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to

³ Although Paragraph 10 of the Office Action refers to claim 11, Applicant assumes that this was intended to be a reference to claims 23 and 26. If this is not correct, clarification is respectfully requested.

Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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By /David G. Luetngen/

FOLEY & LARDNER LLP
Customer Number: 34099
Telephone: (414) 297-5769
Facsimile: (414) 297-4900

David G. Luetngen
Attorney for Applicant
Registration No. 39,282